

THOROUGH DRAINAGE GOOD FARM PRACTICE

The farmer should study conditions causing poor drainage on his land and find remedy for it—then he should plan drainage system to overcome the trouble

JOHN T. STEWART, C. E. Agricultural Engineer, University of Minnesota.

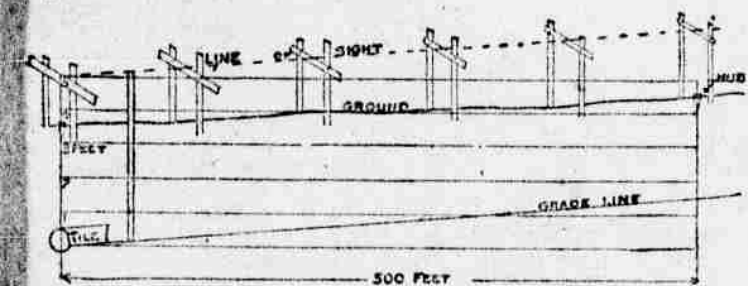
It is not an uncommon thing for a landowner to find a drainage system on his land which has a market value of from \$20 to \$30 per acre, and at almost the same time buy another tract of similar land, at the market price. His desire is to acquire more acres, under the false impression that his property will be devalued by the amount of land in his possession. He does not realize that a acre of thoroughly drained land will bring him a greater income, with less labor and expense of cultivation, than two acres of the undrained land; or that it could be acquired at one-third to one-half the cost of the newly-bought acre. This extra land purchased with the idea that land values will rise. As the real value of land is regulated by its improvements and productivity, the landowner whose only object is to acquire more acres, rather than to improve the land already in his possession, is an "un-derstandable citizen," as he expects to be, rather than his neighbor's improvements.

The idea is popular, especially among the owners of wet lands, that the removal of surplus water by drainage would be of great benefit to the state or community at large. While this is true to a certain extent, and while wet lands belonging to the pub-

lic are of only \$61.50 against \$120.72 per acre, paid for tillable land in the original purchase. But this added value of \$59.22 does not represent all the benefits which have come to the farm from the introduction of underdrainage. The disappearance of the sloughs, and of the superfluous water in other places, permits the division of the land into regular, and therefore more easily cultivated fields. Such fields, having now a uniform soil, can be cultivated in less time, and crop rotations can be arranged to better advantage, than where the land is broken up by non-cultivable areas. A dry, loose soil can be worked more easily than a wet, sticky soil.

Furthermore, a field which in some seasons is productive, and in others non-productive by reason of excessive moisture, may be more detrimental to the farmer's success than swamp land; for such lands are often plowed, planted, cultivated, and then the crop is destroyed by an excess of water; whereby not only are they made non-productive, but labor and seed are lost. Drainage not only removes the risk of such losses, but improves the land by substituting broad, fully-cultivated areas for such as are dotted with sloughs, breeding frogs and mosquitoes and giving forth ill odors from dead fish and decaying vegetation. It is a first step in good road-building, and, as a permanent improvement, it increases the value of all neighboring lands, and benefits the entire community.

All of these benefits are illustrated

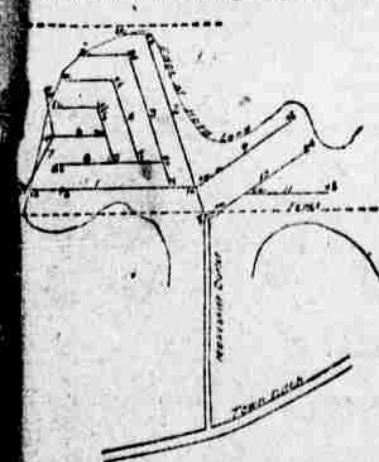


OBTAINING TRUE GRADE LINE BY GRADE LATH METHOD. The line of sight is five feet above the grade line and parallel to it. By setting the lath stakes at the sides and lining up the cross laths the grade may be fixed before the trench is dug.

may be justly held chargeable with their share in the cost of improvements, the facts do not justify the inference that the state should pay it all. The correct idea, in raising funds for drainage works, is that the acre more directly benefited is the acre to pay the expense.

Many landowners will oppose a drainage improvement for the reason that the ditch will, in part, be located on their land. They will do this, even in the face of the fact that from one-fourth to three-fourths of their land, because it is too wet, produces only about half of what it should, in the ordinary year. They actually prefer to stand the yearly loss of half a crop more, rather than allow one-eighth of one-eighth part of this wet land to be occupied by a ditch which would thoroughly drain the whole tract and that it could be cultivated up to the banks of the ditch.

The benefits accruing from drainage are well illustrated in the improvement of a small farm, of 72.80 acres, recently purchased by the state of Minnesota. Six hundred and fifteen dollars were spent in draining this farm. The land had been bought by the state



Map of a Tile Drainage System Used in Wisconsin.

for the specific purpose of cultivation. The 72.80 acres cost \$7,053.15, but of this there was used for highway purposes, four acres; non-productive land in sloughs, five acres; ten acres producing half a crop, equal to a non-productive land, to five acres; or a total of 34 non-tillable acres. The rest a tillable area of 50 acres, costing the state \$120.72 per acre. A system of underdrainage was introduced, by which the five acres of non-productive land in sloughs, and the ten acres which produced half a crop, are made and in productive qualities to the same area of the other tillable land. A total cultivable area is thus increased from 50 to 60 acres. The return to the farm, then, is \$1,207.20, at cost of \$615; or a net gain of \$592.20. Other words, ten additional acres have been added to the farm at a

cost of only \$61.50 against \$120.72 per acre, paid for tillable land in the original purchase.

But this added value of \$59.22 does not represent all the benefits which have come to the farm from the introduction of underdrainage.

The planning of a drainage system should be done with the same care and foresight that is bestowed on other improvements. When a large building is to be constructed, an architect is consulted, plans are carefully drawn, and the details are looked into, and material is selected which will be suitable for the location, the climate and the purpose for which the building should be used. During its construction, inspectors see that the details are carried out and the requirements of the specifications enforced, regardless of the fact that the contractor may be losing money, and cheaper materials might be used. But in drainage enterprises, the evidences of such care are too often painfully lacking, even though the cost be as great or greater than that of a large building. In many cases an engineer is employed to stake out a drain on a route which has been selected only because it is "supposed to be" the best one. No examination is made for another route, or outlet; the area of the watershed is not measured. As a result, the size of the ditch is determined by a mere guess. Time may develop the fact that the best route was not selected, and that the ditch was too large or too small, and consequently does not perform the work satisfactorily. A ditch, being improperly located, either does not drain all the land it should or it is expensive to construct and maintain. One that is too large will not clean itself properly; while one that is too small will not carry required volume of water.

A drainage system, open or underground, works by gravity, and that it may remove the water there must be a sufficient fall; that is, a sufficient and continuous descent, from a level somewhat lower than the lowest point on the land to be drained, to the point where the water is discharged from the outlet. It is a common practice to start a drainage ditch from a slough at practically the same depth as the bottom of the slough. Such "drainage" will not give satisfaction, as the ground-water will not be lowered, and the bed of the slough will continue to be swampy. For satisfactory drainage, the water-channel must be deep enough in the lowest land, and of sufficient breadth and depth, to carry the water without an overflow.

Ditch-construction, like carpentry or masonry, is a business in itself; and for satisfactory results, contracts should be let in similar manner. The bidder's competence, as shown in his record in connection with similar undertakings, should be taken into consideration as well as the size of his bid. Ditches are usually dug in soil the

wettest and most difficult to handle, and it is necessary that construction be carried on during the wettest seasons. Consequently, the contractor should have his calculations as to time and methods on the worst conditions. To let a contract to the "lowest bidder," regardless of his experience or equipment, is often to invite serious disappointment and loss.

Delays, especially, are expensive to landowners, for not only is money invested in incomplete work, but oftentimes a failure to have the ditch complete at the time fixed means the loss of a crop. In the drainage of swamp land, which cannot be plowed until after the work is completed, it means a delay of one or more years before the cultivation will be a paying investment.

With scarcely an exception where losses have accrued to agricultural interests through the delay of a year in the construction of proposed drainage works, these losses have been greater than the cost of the improvements. The attempt to save one or two cents on the cubic yard for ditching, or on the rod for the trenches, by giving the job to a poorly-equipped man, often becomes an expensive proceeding. Better pay more to a competent man, and be sure of a good job, completed "on time."

The kind, size and completeness of the drainage works needed in a given locality, the methods of doing the work and adjusting the costs, must be determined by the local conditions. What is good practice in one place may not be practical in another. The character of the ground, surface slopes, crops raised, and value of land, all have a bearing on the subject. In any locality the first consideration is an outlet or channel by which the water may be carried away. In some localities nature has provided such an outlet. In others, it may be necessary for several landowners to band together and construct a channel, of sufficient size and depth to serve as the main outlet of a network of ditches which will give relief during wet years, in many parts of the state, where such outlets naturally exist or are already completed, crops have suffered from an excess of water in the immediate vicinity, for the reason that the water from the cultivated fields could not readily escape. Consequently, for complete drainage, it is necessary to have, on the individual farm, a thorough system for collecting the water as it falls and carrying it to the main outlet.

Unless the ground is very flat, the location of proposed drains can be best determined when the ground is free from vegetable growths. A heavy growth of crops or weeds may cause low places to look high and high places low. A field freshly plowed or sown is in the best condition for locating lines of drainage. If such a field is examined immediately after a heavy rain, there will be little danger of making a mistake in locating the lines. If these are at once marked out by a

trowel or stakes, it will save much time when it is desired to begin laying tiles.

Any drainage system should be planned with reference both to the work it is to perform and to its future maintenance. Expense should not be spared in securing accurate data on which to base the plan.

It is well to maintain the shallow open-ditch system, in use before the tile are laid. These surface-drains assist in quickly clearing the land of water from heavy rains, in amounts for which it would not be economical to provide tile of sufficient size to do the work so quickly. In Minnesota, spring floods are often carried off by the surface drains before the frost is out sufficiently to permit tile-drains to work. Time spent in opening sur-

face-drains is not, therefore, lost, even when it is intended to later introduce an underdrainage system.

The individual farmer with small means should first select the area the tiling of which will drain the most land at the least expense. In a rolling country, where sufficient fall can be had for outlets near the surface, or without expensive open ditches, small tiles can be used around the sides of drainage areas outletting on a hillside or at the edge of a slough. This method often improves large tracts at small cost, and the improved lands increase in productivity, funds will be supplied by which the tile lines can be extended, connected, and the expensive underdrainage system.

Immediately after construction, provision should be made for annual maintenance. A drainage improvement, properly carried out and maintained, will add its initial cost to the value of the land and pay a dividend on the original investment.

Diagram of a line of levels.

Diagram of a line of levels.

Diagram of a line of levels.

Diagram of a line of levels.

Diagram of a line of levels.

Diagram of a line of levels.

Diagram of a line of levels.

Diagram of a line of levels.

Diagram of a line of levels.

Diagram of a line of levels.

Diagram of a line of levels.

Diagram of a line of levels.

Diagram of a line of levels.

Diagram of a line of levels.

Diagram of a line of levels.

Diagram of a line of levels.

Diagram of a line of levels.

Diagram of a line of levels.

Diagram of a line of levels.

Diagram of a line of levels.

Diagram of a line of levels.

Diagram of a line of levels.

Diagram of a line of levels.

Diagram of a line of levels.

Diagram of a line of levels.

Diagram of a line of levels.

Diagram of a line of levels.

Diagram of a line of levels.

Diagram of a line of levels.

Diagram of a line of levels.

Diagram of a line of levels.

Diagram of a line of levels.

THIS BRIDE IS IN REAL TROUBLE

She Cannot Decide Whether She Loves Husband or Another Man.

BOTH ARDENT SUITORS

Landed First on One, Then on the Other—Repeated Her Bargain After She Had Been Led to Altar and Fled.

Kansas City.—After the most exciting week ever spent by a bridegroom following his wedding, Earl Stevens, a bank clerk, has returned to his desk in the New England National bank here, and his bride is passing her days at the home of her parents in the same city. The couple have not gone to housekeeping yet and there's a reason. The young husband and the bride's parents are not sure he would find her there when he returned home at night; they are not sure she would not have another change of heart and again decide that she had married the wrong one of two suitors, and disappear like she did 24 hours after her marriage.

The story goes back to a church entertainment in which Mrs. Stevens, then Miss Mildred McDonough, took part. She had been escorted to the church by young Stevens and there she met Herbert Gribble, a University of Kansas graduate and a musician. From that time on it was a lover's battle between the two young men. Each pressed the girl to marry him. She was fond of both. Finally one night she consented to marry Gribble.

Stevens heard of it the next day, called Miss McDonough on the telephone and asked for an explanation of the encouragement she had appeared to give him. Again she underwent a change of heart. Stevens was quick to seize his advantage, secured a marriage license and hurried to the parish house with his sweetheart. The pair went to the home of a relative and next morning Stevens returned to work. During the day the bride disappeared.

All the next night the frantic husband and the equally frantic parents sought for the girl. The next day

Stevens bethought himself of Gribble. He called upon the musician who admitted having met the bride downtown. "She said she really loved me and had made a mistake," Gribble said. "She told me she was going away. She did not say where, but I probably will hear from her."

He did. The next day came a telegram that the missing bride was in Oklahoma City, Okla. Gribble turned the message over to the husband, who started with the bride's mother. Upon arriving at Oklahoma City they learned that Mrs. Stevens had left on a train back to Kansas City. A telegram to the girl's father told him to meet the train she was on, but she dodged him by stopping at a suburban station, and riding into the city on a street car. She made straight for home.

A censorship has been established and no word comes from the bride or bridegroom save stories that numerous family conferences are being held in an effort to straighten out the tangle occasioned by the bride's inability to decide whether she loves her husband or Gribble. It is said that the bride has announced her plans for the future are undecided. Meanwhile Stevens sticks to his job in the bank.

Fined for Gum Chewing.

New York.—Because he chewed gum in the presence of Magistrate Krotel while asking for a warrant for a man alleged to have stolen phonograph records from him, Frank Barabones was held in \$500 for contempt of court.

Routes Masher With Pen.

Forestburg, N. Y.—Using a fountain pen in self-defense, Mrs. Beulah Leubert, twenty-four, jabbed and squirmed with ink a masher who had grabbed and hugged her until she put him to rout.

Dwarfs Are Wed.

Greenwich, N. Y.—Miss Elizabeth Jarwick, aged twenty-eight, and Joseph A. Alpuente, aged forty-two, Lilliputians, were married here. The bride is three feet nine inches high and the groom three feet ten inches.

A Year for Each Dollar.

Kansas City, Mo.—One year for each dollar was the sentence pronounced on Calvin Smith, aged twenty-two, charged with passing counterfeit money.

Taken From Exchanges.

It required one and one-half pounds of leather to double tap and heel one pair of a Bath (Mo.) policeman's shoes.

A new trap to be attached to a refrigerator drain pipe permits waste water to flow out, but prevents the entrance of warm air or vermin.

A pneumatic helmet composed of inflatable rubber tubes has been patented for protecting soldiers from gas.

Comparison.

"Dr. Isaiah B. Scott, Methodist bishop of Africa," said a Methodist divine, "collected in Monrovia a great deal of valuable ethnological matter."

"Talking about cannibalism one day, Bishop Scott declared:

"Your cannibal is not wicked. He eats other people as you and I do to church—in order to improve himself—for he has been taught that he will acquire the virtues—the bravery, beauty, wisdom and what not—of all those whom he eats."

Bishop Scott chuckled.

"A savage cannibal," he ended, "is a saintly chap alongside of a civilized backslider."

Too Severe.

Doctor—Your husband needs some good exercise to restore him.

Mrs. X—Like playing golf?

Doctor—More violent than that.

Mrs. X—I have it! I'll send him down to make a few purchases at the bargain counter during the rush hours.

Routes Masher With Pen.

Forestburg, N. Y.—Using a fountain pen in self-defense, Mrs. Beulah Leubert, twenty-four, jabbed and squirmed with ink a masher who had grabbed and hugged her until she put him to rout.

Dwarfs Are Wed.

Greenwich, N. Y.—Miss Elizabeth Jarwick, aged twenty-eight, and Joseph A. Alpuente, aged forty-two, Lilliputians, were married here. The bride is three feet nine inches high and the groom three feet ten inches.

A Year for Each Dollar.

Kansas City, Mo.—One year for each dollar was the sentence pronounced on Calvin Smith, aged twenty-two, charged with passing counterfeit money.

NATIONAL CAPITAL AFFAIRS

Indian Names Simplified for Names of Places

WASHINGTON.—The bureau of ethnology of the Smithsonian institution has recently completed work on the tabulation of Indian names to meet the popular demand for post offices, parks, villa sites and outing organizations. This compilation gives simplified forms in Dakota, Ojibwa, Onondaga, Blackfoot, Cheyenne, Cherokee, Chipewyan and other Indian languages. Many of the names are especially interesting and musical.

In connection with the work of this bureau, officials there say that they are bombarded with requests for "the Indian word" for this or that. It apparently is not generally known that there is no one American Indian language. On the contrary, the two Americas, and practically 200 distinct Indian languages north of Mexico. It becomes, then, impossible to give "the" Indian word for any English equivalent, and consequently it is usually chosen from the language of the tribe which inhabits, or once inhabited, the particular section of the country from which the request comes.

So numerous and difficult are the Indian languages that a committee has recently been appointed to devise a standard method for transcribing them. In addition to the many variations from nation to nation, there are the eccentricities in speech of the individual, of the family proper and of the camp group, all of which tends to intrude transient forms.

New Social Leaders for Washington Due Next March

THE recent election has overturned all of the old social circles and there will be almost entirely new social leaders for the next two years at least. Official social life always plays an important part in the doings of official Washington, and the Sixty-fifth congress will see many prominent society leaders returning to Washington, after in absence, to replace a number of notables who will be retired March 4, through the results of the recent election.

Among the more prominent of the newcomers will be Senator-elect and Mrs. Peter Goelet Garry of Rhode Island, who were extensive entertainers during the sessions of the Sixty-third congress; Representative and Mrs. Mollie McCormack of Chicago; Senator-elect and Mrs. Philander C. Knox of Pennsylvania, who are well known to Washington; Senator-elect and Mrs. John W. Aldrich of New York, and his family; Representative-elect and Mrs. Allen T. Fuller of Massachusetts, and Senator-elect Johnson and his family of California.

The majority of these have already been included in the social register of Washington. Mrs. Goelet was formerly Matilda Townsend of the capital, and spends part of each season here, even when her husband is not engaged at the capital. Mrs. Mollie McCormack, who is a daughter of Mark Hanna, has generally had a prominent place in local social circles through her intense interest in politics. The Knoxs are more or less familiar through the senator's cabinet service, and they have always maintained a home residence here. Senator-elect Aldrich of New York had a long career in the house, which makes him thoroughly familiar in capital society, and Governor Johnson and Representative-elect Fuller will be among the really new faces in Washington.

Among those whose passing will be noted with regret are Senator and Mrs. Henry S. Lippert of Rhode Island, Senator Oliver of Pennsylvania, Senator Kern of Indiana, Senator Sutherland of Utah and Senator de Brouwer. All of these families have long been identified with the social life of the capital.

District Sparrows Cling to Their Favorite Tree

THE passer domesticus is celebrated for its fondness for human habitation and its propensity, according to Webster, also, for its occupation of a certain tree in front of the District building, according to Washingtonians. For passer domesticus is just a polite expression for what human beings call the English sparrow.

Why should the passer domesticus Washingtonians choose that particular tree in front of the District building. Everyone knows that Fourteenth and Pennsylvania avenue and its vicinity are about the loveliest part of Washington. Street cars run by every half minute or so, automobiles and cabs are continually moving up and down, and policemen, commissioners and the other officials in the District building go to and fro along the sidewalk continually. Yet the sparrow chooses that particular tree out of the thousands with which the streets of Washington are bordered.

No explanation can be given at the "tree department" in the District building. There is much curiosity there as to why the sparrow chooses that particular kind of tree. Sycomores are planted every few feet down the avenue, but in the words of a policeman, "there wasn't a thing doing."

When Major Sylvester was chief he tried the experiment of shooting sparrows through the tree at night. A few angry, discontented and sleepy sparrows resulted. There was a flutter of wings, the sparrows left—and came back next day.

At the department of agriculture, the expert on birds, and especially sparrows, said the ways of a sparrow are many, and if he (the sparrow) wanted to roost or play in that particular tree, there was no known reason, rhyme nor reason. There was one, too, to cut the top of the tree off, beginning six inches from the ground, but in that case the sparrow would take up his residence in the tree next door.

So, there is no scientific explanation of the wants of the English sparrow. He prefers that tree, and in that tree he will stay, and it predictions based on history are correct, in that tree his children will live and flourish until it (the tree) dies of old age.

White House Relics Now Are Properly Displayed

AN IMPORTANT change has been made recently in the White House collection of presidential relics, a collection which since 1903 has been one of the show features of the mansion. From its inception under Mrs. Roosevelt, the relics of this unique and historical collection have been kept in small walnut cabinets which have stood in the ground-floor corridor, where the thousands of sightseers who visit the White House annually have had a chance to see and enjoy their interesting contents.

More than two years ago the relics were removed from the six cabinets which held them, and plans were made for setting aside a room for the exclusive use of the collection.

A short time before the President and Mrs. Wilson left for Shadow Lawn last fall, Col. W. W. Harts, superintendent of public buildings and grounds, brought to Mrs. Wilson's attention the plans for remodeling a room for the collection and showed her drawings for the first of the new cabinets. Mrs. Wilson heartily approved the project, and selected the room to be used. It is directly at the south of the main stairway on the ground floor corridor of the White House.

The walls and ceilings of the room, were tinted a deep cream and the woodwork painted an ivory white.

The relics in the cabinets are arranged as far as possible in chronological order, according to the presidential succession.

PICKED UP HERE AND THERE

Chewing gum is becoming popular among the Chinese in Hongkong.

A strike of underwriters took place at Liverpool, England, recently.

American preserved pineapples from Hawaii find favor in Canada.

The temperature at South Pole falls rather not more than 100° below zero.

A bank had its first robbery here in the city of Chicago.

The Roumanian army is known for its sharpshooters.

A German farm implement was used in a single trip over a field.

A centrifugal pump was used with an electric motor.

It has been invented.

BITS OF INFORMATION

Since 1870 white illiteracy in Georgia has been reduced from 27 to 3 per cent, and black from 92 to 30 per cent.

To aid in walking on icy sidewalks, a water-proof shoe has been patented.

Electric tobacconists are in use in England, in which powerful electric magnets are used instead of couples in drawing pipes.

China has the longest national hymn.

Both the incumbent of the pastorate of the Methodist church at Smiley, Tex., and his predecessor are one-armed men.

Long utilized by the Indians for cooking their food, petroleum deposits of Kansas have been investigated by scientists and will be developed commercially.

While the male will continue to be the standard draft animal in the South, a gradual substitution of heavy horses on the farm is going on.

The Conebe, Shipho Cocoon and Yuhit tribes of Amazon Indians are still wearing clothing of grass.

The nation's toll to the fire demon is approximately 5,000 deaths a year and a property loss of \$700 a minute.

The annual income in the electrical industry is equal to the total annual expenditures of the United States government.

The death rate for the registration area of the United States last year was the lowest of which there is any record.

The Conebe, Shipho Cocoon and Yuhit tribes of Amazon Indians are still wearing clothing of grass.

The nation's toll to the fire demon is approximately 5,000 deaths a year and a property loss of \$700 a minute.

The annual income in the electrical industry is equal to the total annual expenditures of the United States government.

The death rate for the registration area of the United States last year was the lowest of which there is any record.

The Conebe, Shipho Cocoon and Yuhit tribes of Amazon Indians are still wearing clothing of grass.

The nation's toll to the fire demon is approximately 5,000 deaths a year and a property loss of \$700 a minute.

The Conebe, Shipho Cocoon and Yuhit tribes of Amazon Indians are still wearing clothing of grass.

The nation's toll to the fire demon is approximately 5,000 deaths a year and a property loss of \$700 a minute.

The annual income in the electrical industry is equal to the total annual expenditures of the United States government.

The death rate for the registration area of the United States last year was the lowest of which there is any record.

The Conebe, Shipho Cocoon and Yuhit tribes of Amazon Indians are still wearing clothing of grass.

The nation's toll to the fire demon is approximately 5,000 deaths a year and a property loss of \$700 a minute.